SECTION 15103
SANITARY WATER HOT (SWH) AND COLD (SWC)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY

A. Copper tubing system for above-grade application for Sanitary Water Hot and Cold (SWH &SWC) with 140ºF (60ºC) maximum temperature and 150-psig maximum pressures.

B. Copper tubing system for below grade application for Sanitary Water Cold (SWC) with 65ºF (18.3ºC) maximum temperature and 150-psig maximum pressure.

C. Safety Shower Water piping systems for above-grade application with 65ºF (18.3ºC) maximum temperature and 150-psig maximum pressures.

D. Fire Protection Water (FP): Coordinate Substructure related fire protection water service requirements for this task with Site Utilities and Fire protection services provided within the building by others. In the event that is not feasible provide FP water piping materials as specified for Sanitary Water Cold (SWC).

E. Reduced Pressure Back-flow preventer assembly.

F. Related Sections
1. Section 15050, Piping Systems.
2. Section 15072, Cleaning
3. Section 15073, Pressure/Leak Testing
4. Section 15074, Identification and Labeling.
5. Section 15100, Valves.
6. Section 15250, Mechanical Insulation.

1.3 REFERENCES

A. American National Standards Institute (ANSI)
1. ANSI B16.1-89, Cast Iron Pipe Flanges and Flanged Fittings.
2. ANSI B16.3-92, Malleable Iron Threaded Fittings.
3. ANSI B16.21-92, Nonmetallic Flat Gaskets for Pipe Flanges.
4. ANSI B16.39-86, Malleable Iron Threaded Pipe Unions Classes 150, 250 and 300.
5. ANSI B31.9-96, Building Services Piping.

B. American Society for Testing and Materials
1. ASTM A53-93a, Standard Specification for Pipe, Steel, Black and Hot-dipped, Zinc-coated, Welded and Seamless.
2. ASTM A126-93, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
3. ASTM A197-87, Standard Specification for Cupola Malleable Iron (R 1992).
4. ASTM A307-94, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
5. ASTM A563-94, Standard Specification for Carbon and Alloy Steel Nuts.
6. ASTM B88-961, Standard Specification for Copper.

7. ASTM D2000-90, Standard Classification System for Rubber Products in Automotive Applications (SAE Recommended Practice J200).

C. Southern Building Code Congress International Incorporated
1. Standard Plumbing Code (1994).

D. ASME Section VIII, Boiler and Pressure Vessel Code (1998).

1.4 SUBMITTALS

A. Product Data: For all piping, fittings, and couplings: Indicate dimensions, required clearances, methods of assembly of piping components, and piping accessories.

B. Submit six (6) copies of the following to the Construction Manager:
1. Design Data: Indicate in sufficient detail to verify that products meet or exceed specified performance requirements.
2. Certificates: Indicate in sufficient detail to verify that products do meet (or exceed) specified requirements.
3. Manufacturer's Instructions: Indicate installation and support requirements.
4. Shop drawings: Provide large-scale (Scale of ¼" = 1'-0" minimum) layout drawings, indicating all relevant equipment associated with routing of piping.
Shop drawings shall be "spool" type that includes all piping connection joints, fittings, hangers, supports required and relevant details as required.
5. Coordination Drawings: Include relationship to other services that serve same work areas.
6. Certificates of Shop Inspection and Data Report: As required by ASME Boiler and Pressure Vessel Code.
7. Maintenance Data: For equipment to include in the maintenance manuals as specified in General and Supplementary Conditions.

1.5 QUALITY ASSURANCE

A. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.4 COORDINATION

A. Coordinate layout and installation of hydronic piping and suspension system components with other construction, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

B. Coordinate pipe sleeve installations for foundation wall penetrations.

C. Coordinate piping installation with roof curbs, equipment supports, and roof penetrations.

D. Coordinate pipe fitting pressure classes with products specified in related Sections.

E. Coordinate installation of pipe sleeves for penetrations through exterior walls and floor assemblies. Coordinate with requirements for Firestopping specified in Division 7 Section "Through-Penetration Firestop Systems" for fire and smoke wall and floor assemblies.

PART 2 - PRODUCTS

2.1 MATERIALS: Use materials selected from list below except where specified otherwise.

A. Above-grade Sanitary Water Cold (SWC) and Sanitary Water Hot (SWH) Piping.
1. 2" and Smaller: ASTM B88 Type L or K copper tube with copper pressure fittings and soldered joints or Victaulic Vic-Press 304 .049 wall 304 stainless steel pipe, fittings and couplings.
2. 21/2" and larger: ASTM B88 Type L or K copper tube with copper pressure fittings and soldered joints or grooved copper fittings and joints.

B. Below grade Sanitary Water cold (SWC) Piping.
1. 4" and Smaller shall be ASTM B88 Type K hard drawn copper with ANSI B16.18 or ASME/ANSI B16.22 solder joint fittings or 21/2" to 4" grooved copper fittings and joints and 2" and smaller Victaulic Vic-Press 304 .049 wall 304 stainless steel pipe, fittings and couplings.

2.2 COPPER TUBING

A. Hard Copper Tube: ASTM B 88, Type L or K as above or below grade installation applies respectively.

B. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.

C. Grooved Copper Fittings: Wrought copper per ASTM B-75 C12200 or ASTM B-152 C11000 and ANSI B 16.22 or bronze sand casting per ASTM B-584-87 copper alloy CDA 836 (85-5-5-5) per ANSI B 16.18.

D. Grooved Couplings for Copper Fittings: Housing made of Ductile Iron conforming to ASTM A-395, grade 65-45-15, and ASTM A-536, grade 65-45-12 coated with copper colored alkyd enamel. Coupling to incorporated an angle bolt pad design to achieve rigidity.

E. Flanges for use on Grooved Copper Fittings: Class 150, ductile iron conforming to ASTM A-536 coated with copper colored alkyd enamel.

F. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.

G. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and–socket, metal-to metal seating surfaces and solder-joint or threaded ends.

H. Gaskets: Nonasbestos, red rubber sheet, ASTM D2000 M2AA 507 A13, 1/16-inch-thick, full face, ANSI B16.21; SEPCO Style 20.

I. Gaskets for Grooved Couplings and Flanges: EPDM for temperatures from –30F to 230F, UL classified in accordance with ANSI/NSF 61.

J. Bolts: Steel, heavy hex head, ASTM A307 Grade B.

K. Nuts: Steel heavy hex head, ASTM A563 Grade B.

L. Soldered Joints: Use ASTM B813, water-flushable, lead-free flux; and ASTM B 32, lead-free-alloy solder; unless otherwise indicated.

M. Valves: See Section 15100 for valve descriptions.

Service	Size (NPS)	Number	End type
Shutoff			
Butterfly	½ to 2	V-6474	Screwed
Butterfly	2 ½ to 3	V-6478	Grooved
Gate	¼ to 2	V-1	Screwed
Gate	To 2	V-6055	Screwed
Gate	2 ½ to 3 ½	V-5	Flanged
Ball	¼ to 2	V-6468	Screwed
Control			
Globe	¼ to 2	V-6036	Screwed
Globe	2 ½ to 3 ½	V-102	Flanged
Hose Bibb	½ and ¾	V-6079	Screwed
Angle	¼ to 3	V-6089	Screwed
Wall Hydrant			
Freezeproof	¾	Per drawing	Screwed
Check			
Swing	¼ to 2	V-201	Screwed
Swing	2 ½ to 3 ½	V-204	Flanged
Center Guide	2 to 3 ½	V-1376	Wafer

N. Valve Stem Packing (for repacking only): Nonasbestos.

2.3 STEEL PIPING

A. Pipe (to NPS 4): Steel, ASTM A53 Grade A or B, furnace welded, Schedule 40, galvanized.

B. Pipe (NPS 6 to NPS 10): Steel, ASTM A53 Grade A or B, ERW or seamless, Schedule 40, galvanized.

C. Pipe (NPS 10 to NPS 12): Steel, ASTM A53 Grade A or B, ERW or seamless, standard weight, galvanized.

D. Fittings (to NPS 2): Malleable iron, ASTM A 197, threaded, ANSI B16.3 Class 150, galvanized.

E. Fittings (NPS 2 ½ to NPS 12): Cast iron, ASTM A126 Class A or B, flanged ends, ANSI B16.1 Class 125, galvanized or ductile iron ASTM A-395, grade 65-45-15 and ASTM A-536, grade 65-45-12, grooved end, galvanized.

F. Unions (to NPS 2): Malleable iron, ASTM A197, threaded, brass-to-iron seats, ANSI B16.39 Class 150, galvanized.

G. Grooved Couplings (NPS 2 ½ to NPS 12): Ductile iron conforming to ASTM A-536, galvanized.

H. Flanges (NPS 2 ½ to NPS 12): Cast iron, ASTM A126 Class A or B, threaded companion, ANSI B16.1 Class 125, smooth or serrated face per MSS SP-6, galvanized.

I. Grooved Flanges (NPS 2 ½ to NPS 12): Ductile iron conforming to ASTM A-536, galvanized.

J. Gaskets: Nonasbestos, red rubber sheet, ASTM D2000 M2AA 507 A13, 1/16-inch-thick, full face, ANSI B16.21; SEPCO Style 20.

K. Bolts: Steel, heavy hex head, ASTM A307 Grade B.

L. Nuts: Steel heavy hex head, ASTM A563 Grade B.

M. Caps (to NPS 2): Malleable iron, ASTM A197, threaded, ANSI B16.3 Class 150, galvanized.

N. Joint Compound: PTFE thread seal tape, SEPCO.

O. Valves: See Section 15100 for valve descriptions.

Service	Size (NPS)	Number	End type
Shutoff			
Butterfly	4 to 12	V-6431	Flanged
Butterfly	4 to 12	V-6483	Grooved
Gate	4 to 12	V-5	Flanged
Control			
Globe	4 to 12	V-102	Flanged
Check			
Swing	4 to 12	V-204	Flanged
Center Guide	4 to 12	V-1376	Wafer
Spring	4 to 12	V-205	Grooved

P. Valve Stem Packing (for repacking only): Non-asbestos.

2.4 STAINLESS STEEL PIPING

A. Pipe (NPS ½ to NPS 2): Victaulic stainless steel Vic-Press 304 pipe, ASTM A-269, grade 304/304L, .049 wall, certified for use with Vic-Press 304 stainless steel products.

B. Fittings (NPS ½ to NPS 2): Victaulic stainless steel Vic-Press 304 fittings, formed from austenitic stainless steel.

C. Couplings (NPS ½ to NPS 2): Housing body precision cold drawn austenitic stainless steel with self-contained o-ring seals in the coupling ends.

D. Flanges (NPS ½ to NPS 2): 304 stainless steel ends with DI backing ring, Victaulic Style 565 Van Stone flange adapter, class 150.

E. Valves: See Section 15100 for valve descriptions.

Service	Size (NPS)	Number	End type
Shutoff			
Ball	½ to 2	V-6470	Pressfit

2.5 REDUCED PRESSURE BACKFLOW PREVENTER

A. Backflow preventers shall be of the reduced pressure type with test cocks, two check valves and an automatically operating pressure differential relief valve located between the two check valves. The relief valve and relief valve discharge port shall be low enough to drain the intermediate chamber to a level below the supply line inlet. Moving parts and trim shall be made of corrosion resistant materials.

B. See Specification Section 15100, Valve data sheet Back-Flow Preventing Valve V-301. (FEBCO, Model No.860 or 880/880V as size requirements designate).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install piping system per Category D Fluid Service requirements of ANSI B31.9, Standard Plumbing Code, and Section 15050.

B. Provide reduced pressure principle backflow preventers or air gap separators between potable water mains and process water connections.

C. Provide vacuum breaker in supply line at elevation above overflow line when submerged potable water supply line is connected to fixture, tank, or other equipment.

D. Provide locked shield type gate Valve V-6055 for shutoff service in safety shower water lines in sizes to 2 in. Provide gate Valve V-5 with handwheels chained and padlocked in open position for shutoff service in safety shower water lines in sizes 2 ½ in. and larger.

E. Insulate Sanitary Water piping per Section 15250 with insulation thickness specified.

F. Identification/Labeling: Section 15074.

3.2 FIELD QUALITY CONTROL

A. Pressure/Leak Test: Section 15073, Class B.

3.3 CLEANING

A. Clean potable water piping in accordance with Section 15072 “Cleaning”.

END OF SECTION 15103